



United States Department of Agriculture
Animal and Plant Health Inspection Service

Plant Protection and Quarantine



Nursery Research Needs Update

Center for Plant Health Science and Technology

STOPPING THE SPREAD

Effective, fast, reliable methods for (early) detection of *P. ramorum* in plants, water, soil

Detection vs. recovery of *P. ramorum* in soil and water

Distribution in the nursery

Persistence

Infectivity

Quantification

Distinguishing dead vs. dormant *P. ramorum* in detections

EPIDEMIOLOGY

Understanding the sources of inoculum – plants, leaf litter, potting media, substrate, water

Frequency and importance of root infection in horticultural hosts

Rate of spread

Threshold populations

Leaf wetness period

Means of dispersal: splash vs. aerial dispersal

Are there “superspreaders/spore pumps” in nursery

- Cultivar and species differences
- Type of spore produced (sporangia vs. chlamydospores)

What environmental conditions and cultural practices influence disease incidence in a nursery

What physiological state does the host need to be in, in order to become infected

What inoculum load is needed in irrigation water to cause plant infection

What is the inoculum threshold required for a plant to become infected by *P. ramorum*-contaminated soil

Water

Practical way to determine if irrigation water is infested

Dose-response relationships

Baiting vs. quantification

Effect of sprinkler heads, etc.

Practical management tools for growers

Sanitation

What sanitation methods are effective for disinfection of nursery beds, propagation facilities, equipment

From medium to high priority, better tools and understanding of sanitation to stop the spread of *P. ramorum*

For soil sterilization, add chlorine dioxide to the list of chemicals to test on *P. ramorum*

Are there other valid treatments for nursery stock, e.g. heat treatment to remove surface inoculum

SYMPTOMLESS HOSTS

What are the conditions when infections may be latent and symptoms are not visible

What is the frequency with which this occurs in the field

Significance of symptomless hosts in spreading disease

Which hosts

Root infections

Chlamydospores in asymptomatic tissue

Symptomless sporulators

REPEAT/RECURRENT NURSERIES

How to distinguish between repeat and recurrent

Genotype isolates to track epidemiology

Sources and pathways

Modeling approaches – connectivity

Critical importance of getting researchers involved in infested nurseries quickly: soil sampling, spread, location (involve modelers), focal pts., distribution of pathogen in the nursery

Investigate soil & roots

Nursery layout, procedures and protocols, environment, physical location

Soil treatment options: fumigation, solarization, heat treatment (steam)

Water treatment options

Network analysis/modeling

BUFFERS

What crops can be planted next to host plants in nursery settings which have the same growing requirements

What crops are resistant

FUNGICIDES

Several publications on existing registered materials, need to evaluate new and existing chemistries

Fungicides and fungistats including fungicide management

Biocontrol

Efficacy on different hosts

Do they prevent sporulation

Conditions when fungicides could/should be effective

Concern that fungicide only suppresses symptom development & delay – needs more attention, could still result in spread (long residual activity)

Perceptions about amounts used may not be accurate

Examine management issues to reduce fungicide usage

What is the residual of various fungicides

What impact does pruning of Host and Associated Plants (HAP) have on their susceptibility to infection

Determine if potting media and/or the components will harbor *P. ramorum* propagules

Can *P. ramorum* be detected in chemically treated plants via molecular diagnostics?

Of the regulated host genera, are there resistant varieties of Camellias, Rhododendrons and Viburnums?

Acknowledgements

Karen Suslow

Jennifer Parke

Nic Grunwald

Steve Tjosvold

Nina Shishkoff

Paul Tooley

Kathy Kosta

Gary Chastagner

Jonathan Jones

Susan Frankel

Janice Alexander

Katie Palmieri